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13. ABSTRACT (Maximum 200 words) THE PHASE II PROGRAM FOR SITE 3-4, A POSSIBLE DBCP SPILL AREA IN THE RAILROAD YARDS, CONSISTED OF 10 BORINGS YIELDING 23 SAMPLES. THE BORINGS WERE PLACED TO INVESTIGATE C6H6, CCL4, AND TCLEE. SELECTED SAMPLES WERE ANALYZED FOR SEMIVOLATILE ORGANICS, VOLATILE AROMATIC ORGANICS, VOLATILE HALOGENATED ORGANICS, AND DBCP. THE FOLLOWING ANALYTES WERE DETECTED WITHIN OR ABOVE THEIR RESPECTIVE INDICATOR RANGES: ALDRN, DLDNR, AND DBCP. RESULTS OF THE PHASE II SAMPLING PROGRAM WILL BE ASSESSED AS PART OF THE OVERALL ANALYSIS FOR THE WESTERN STUDY AREA REPORT.			
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— COMMITTED TO PROTECTION OF THE ENVIRONMENT —

FINAL  
PHASE II DATA ADDENDUM  
SITE 3-4  
NEMAGON SPILL AREA  
VERSION 3.1

DTIC Q

October 1988  
Contract No. DAAK11-84-D-0017  
TASK NO. 20 - Lower Lakes

**EBASCO SERVICES INCORPORATED**

R. L. Stollar and Associates  
California Analytical Laboratories, Inc.  
DataChem, Inc. Geraghty & Miller, Inc.

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LITIGATION TECHNICAL SUPPORT AND SERVICES

ROCKY MOUNTAIN ARSENAL

FINAL  
PHASE II DATA ADDENDUM  
SITE 3-4  
NEMAGON SPILL AREA  
VERSION 3.1

DTIC QUALITY INSPECTED 3

October 1988  
Contract No. DAAK11-84-D-0017  
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Prepared by:

EBASCO SERVICES INCORPORATED  
R.L. STOLLAR AND ASSOCIATES  
CALIFORNIA ANALYTICAL LABORATORIES, INC.  
DATACHEM, INC. GERAGHTY & MILLER, INC.

Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR  
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

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## 1.0 PHASE II PROGRAM

Due to the detection of benzene, carbon tetrachloride, tetrachloroethylene, and a number of tentatively identified nontarget compounds at Site 3-4 during the Phase I contamination assessment, and the discovery of detectable levels of dibromochloropropane during the PETREX soil gas program (Ebasco, 1988/RIC 88076R04), a Phase II program was initiated at Site 3-4 in the spring of 1988. The Phase II program was generally conducted as presented in the Phase I Contamination Assessment Report (CAR). Boring locations, depths, and number of samples were as planned in the Phase I program, except at Borings 31, 33, 34, and 37 where poor recovery after the 0 to 1 feet (ft) sample was collected necessitated that the borings be relocated in order to enable the collection of samples at deeper intervals. Boring 31 was moved 0.3 ft south and Borings 33 and 34 each were moved 0.5 ft south so that the 4 to 5 ft intervals could be sampled. The 2 to 3 ft sample for Boring 37 was collected at a location 0.5 north of the original borehole. A total of ten borings, three to 3 ft, four to 5 ft, and three to 8 ft, were drilled and sampled, yielding 23 samples.

Prior to any Phase II drilling, the Program Manager's Office, Ebasco, Morrison-Knudsen Engineers (MKE), and R.L. Stollar and Associates formulated procedures for MKE to obtain subsamples from selected soil cores during Phase II drilling. MKE did not subsample any borings for Site 4-3.

Analytes and analytical methods were generally as planned in the Phase I program. Selected samples (see Table 3-4-II-2, Section 4.0 of this report) were analyzed by gas chromatography/electron capture detector (GCECD) for dibromochloropropane (8 samples), by gas chromatography/mass spectrometry (GC/MS) for semivolatile target organics (6 samples), by gas chromatography/photoionization detector (GCPID) for volatile aromatic organic compounds (9 samples), and gas chromatography/conductivity detector (GCCON) for volatile halogenated organic compounds (9 samples). One sample was analyzed for volatile target organics by the GC/MS method. This method can also detect nontarget analytes. Gas chromatography/mass spectroscopy confirmation analysis was also requested for one of the samples (rather than

two, as originally planned). Appendix 3-4-II-A presents a complete list of all analytical methods and target analytes used in the Phase I and Phase II programs; methods and analytes were chosen from the list for use at this site.

## 2.0 PHASE II FIELD OBSERVATIONS

There were no appreciable changes at the site since the Phase I program was conducted in the fall of 1987. No new field observations were noted at the time of Phase II drilling.

In situ air monitoring was conducted during drilling operations for safety purposes using a photoionization detector (HNU) and an organic vapor analyzer (OVA). No OVA reading above background was detected, nor were any HNU readings recorded above background level. The results of the volatile organic readings down the borings at the sampled depths are presented in Table 3-4-II-2, Section 4.0 of this report.

The history of this site did not indicate a need for use of an M8 alarm or M18A2 test kit. No unexploded ordnance, buried metal, or other objects were detected during drilling. Drilling difficulties were encountered at all ten borings due to trains occupying and moving along the tracks, between which borings were to be drilled. No unusual coloring or staining of the core samples was noted.

## 3.0 GEOPHYSICAL EXPLORATION

No geophysical survey was conducted at Site 3-4 during Phase II drilling because historical data indicated that the presence of unexploded ordnance, buried metal, or any other object was highly unlikely.

## 4.0 PHASE II ANALYTE LEVELS AND DISTRIBUTION

The number of samples containing each analyte, the concentration range, median, mean, standard deviation, detection limit, and indicator level are listed in Table 3-4-II-1. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table 3-4-II-2. Table 3-4-II-3 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the

Table 3-4-II-1. Summary of Analytical Results for Site 3-4, Phase II. Page 1 of 1.

Constituent Detected	Number of Samples*	Range	Concentration (ug/g)				DataChem Detection Limit	CAL Detection Limit	Indicator Level
			Median**	Mean**	Standard Deviation**				
<u>Volatile Organic Compounds (N=1)</u>									
None detected									
<u>Volatile Aromatic Organics (N=9)</u>									
None detected									
<u>Volatile Halogenated Organics (N=9)</u>									
None detected									
<u>Semivolatile Organic Compounds (N=6)</u>									
Aldrin	1	2	-	-	-	0.3	0.3	0.3	DL
Dieldrin	2	0.5-7	-	-	-	0.3	0.3	0.3	DL
Dibromochloropropane (N=8)	2	0.38-1.3	-	-	-	0.0050	0.014	0.014	DL

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate  
 N - Number of samples analyzed  
 \* - Number of samples in which constituent was detected; only these sample results were used in statistical analyses  
 \*\* - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples  
 \*\*\* - Laboratory not certified for analytical method



Table 3-4-II-2. Results of Phase II Field Study. Page 1 of 3.

Depth (feet)	Boring 28				Boring 29				Boring 30			
	2-3	4-5	7-8		2-3	4-5	7-8		2-3	4-5	7-8	
Geologic Material	Sand w/Clay trace Gravel	Clayey Sand	Gravelly Sand		Clayey Sand trace Gravel	Clayey Sand	Sand w/Clay trace Gravel		Clayey Sand w/Gravel	Sand w/Gravel	Clayey Sand	
Percent FinesVO	10	15	0		10	20	10		30	0	35	
AIR MONITORING												
<u>Volatile Organic Readings (ppm)</u>												
HNu*	BKD	BKD	BKD		BKD	BKD	BKD		BKD	BKD	BKD	
OVA*	BKD	BKD	BKD		BKD	BKD	BKD		BKD	BKD	BKD	
SOIL CHEMISTRY												
<u>Volatile Organic Compounds (ug/g)</u>												
	NA	NA	NA		NA	NA	NA		NA	BDL	NA	
<u>Volatile Aromatic Organics (ug/g)</u>												
	BDL	BDL	BDL		BDL	BDL	BDL		BDL	BDL	BDL	
<u>Volatile Halogenated Organics (ug/g)</u>												
	BDL	BDL	BDL		BDL	**BDL	BDL		BDL	BDL	BDL	
<u>Semivolatile Organics (ug/g)</u>												
Aldrin	NA	NA	NA		NA	NA	NA		NA	NA	NA	
Dieldrin	NA	NA	NA		NA	NA	NA		NA	NA	NA	
<u>Dibromochloropropane (ug/g)</u>												
	NA	NA	NA		NA	NA	NA		NA	NA	NA	

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

\* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

\*\* - Phase II method confirmed by gas chromatography/mass spectrometry (GC/MS)

11/3/88

Table 3-4-II-2. Results of Phase II Field Study. Page 2 of 3.

Depth (feet)	Boring 31		Boring 32		Boring 33		Boring 34	
	0-1	4-5	0-1	4-5	0-1	4-5	0-1	4-5
Geologic Material	Sand	Clayey Sand	Sand	Sand	Sand w/Gravel	Sand	Sand w/Gravel/Clayey Sand	Sand
Percent Fines VO	0/15	10	0	0	0	0	0/25	0
AIR MONITORING								
<u>Volatile Organic Readings (ppm)</u>								
HNu*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
OVA*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY								
<u>Volatile Organic Compounds (ug/g)</u>								
	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Aromatic Organics (ug/g)</u>								
	NA	NA	NA	NA	NA	NA	NA	NA
<u>Volatile Halogenated Organics (ug/g)</u>								
	NA	NA	NA	NA	NA	NA	NA	NA
<u>Semivolatile Organics (ug/g)</u>								
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA
<u>Dibromochloropropane (ug/g)</u>	1.3	BDL	BDL	BDL	BDL	BDL	0.38	BDL

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

\* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

11/3/88

Table 3-4-II-2. Results of Phase II Field Study. Page 3 of 3.

Depth (feet)	Boring 35		Boring 36		Boring 37	
	0-1	2-3	0-1	2-3	0-1	2-3
Geologic Material	Sand	Clayey Sand	Sand trace Gravel	Clayey Sand	Sand trace Gravel	Clayey Sand w/Silt
Percent Fines VO	0	20	0	30	0	25
AIR MONITORING						
<u>Volatile Organic Readings (ppm)</u>						
HNu*	BKD	BKD	BKD	BKD	BKD	BKI
OVA*	BKD	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY						
<u>Volatile Organic Compounds (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Volatile Aromatic Organics (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Volatile Halogenated Organics (ug/g)</u>						
	NA	NA	NA	NA	NA	NA
<u>Semivolatile Organics (ug/g)</u>						
Aldrin	BDL	BDL	BDL	BDL	2	BDL
Dieldrin	BDL	BDL	BDL	BDL	7	0.5
<u>Dibromochloropropane (ug/g)</u>						
	NA	NA	NA	NA	NA	NA

BDL - Below detection limit

BKD - Background

NA - Not analyzed

VO - As determined by visual observations and rounded to the nearest 5 percent

\* - As referenced to calibration standard of methane for OVA, and benzene for HNu; reading has been adjusted to account for background level

11/3/88

Table 3-4-11-3. Summary of Analytical Results for Site 3-4, Phase II, Page 1 of 1.

Constituent Detected	Number of Samples*	Range	Concentration (ug/g)				Indicator Level
			Median**	Mean**	Standard Deviation**	DataChem Detection Limit	
<u>Volatile Organic Compounds (N=1)</u>							
None detected							
<u>Volatile Aromatic Organics (N=9)</u>							
None detected							
<u>Volatile Halogenated Organics (N=9)</u>							
None detected							
<u>Semivolatile Organics (N=6)</u>							
Aldrin	1	2	-	-	-	0.30	DL
Dieldrin	2	0.5-7	-	-	-	0.30	DL
Dibromochloropropane (N=8)	2	1.3-0.38	-	-	-	0.0050	DL

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate  
 N - Number of samples analyzed  
 \* - Number of samples in which constituent was detected; only these sample results were used in statistical analyses  
 \*\* - Medium, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

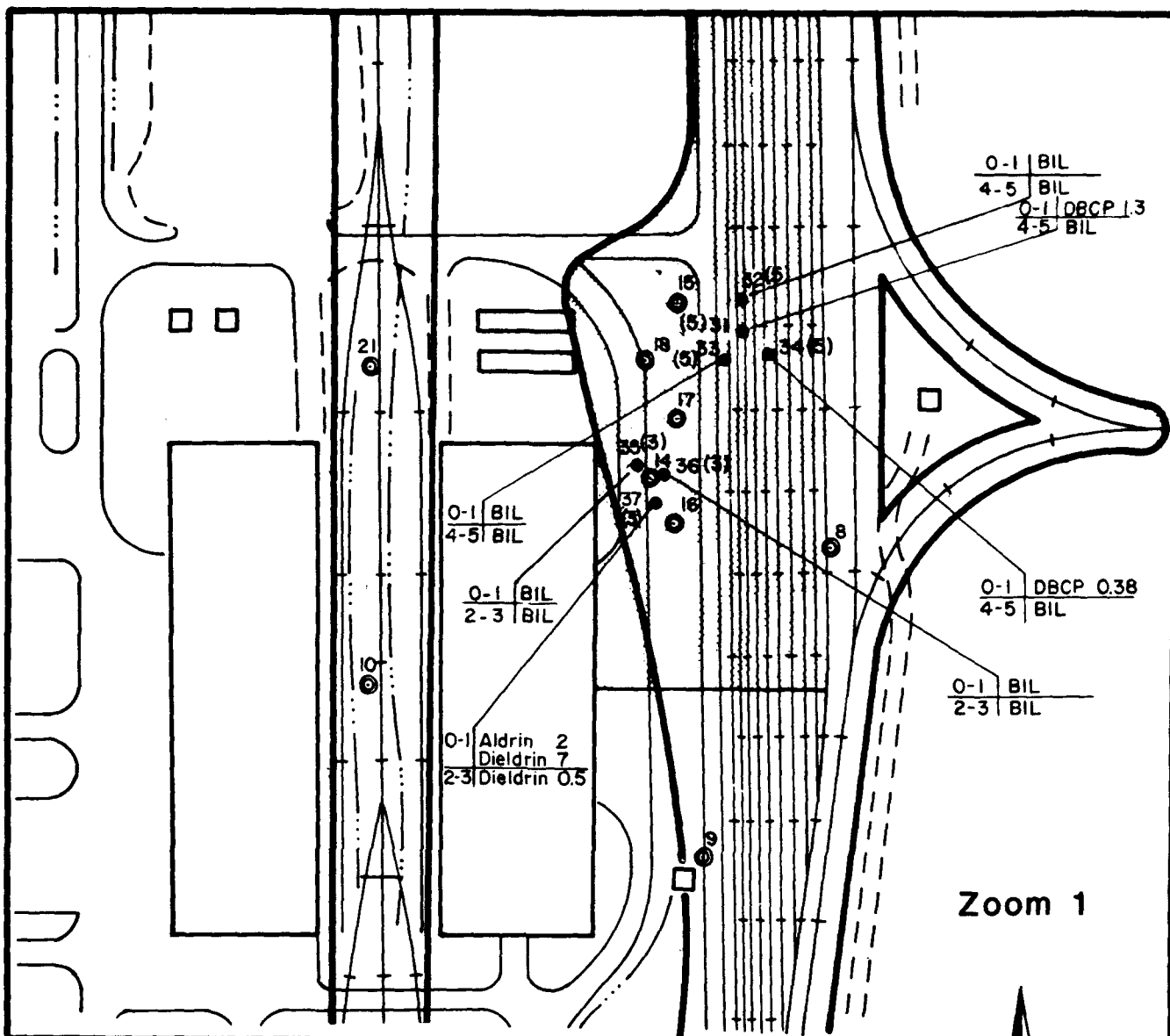
table), concentration, sample number, lot, best-fit identification, and comments for those nontarget compounds detected by GC/MS analysis of samples from Site 3-4. A tabulation of all analytical data associated with the Phase II program is presented in Appendix 3-4-II-B.

To assess the significance of the metal and organic analytical values, indicator ranges were established during the Phase I program. For organic compounds, the indicator level is the method detection limit. For metals, a range of values was chosen to reflect the upper end of the expected natural range for each metal as normally found in RMA alluvial soil. The procedure for establishing indicator ranges is presented in the Introduction to the Contamination Assessment Reports (ESE, 1987/RIC 88204R02).

Samples from the Phase II borings were analyzed for semivolatile and volatile target organics, volatile aromatic organics, volatile halogenated organics, and dibromochloropropane. Figures 3-4-II-1 and 1b, which show the locations of the borings as drilled, illustrates the analytes detected within or above their indicator levels. Aldrin, dieldrin, and dibromochloropropane were detected in the samples from Site 3-4 (Figures 3-4-II-1 and 1b). For purposes of comparison, the analytes detected within or above their indicator levels during the Phase I program are also presented in Figures 3-4-II-1 and 1b. At Site 3-4, both Phase I and Phase II programs used the same methods of analysis and detection limits for dibromochloropropane and volatile and semivolatile organics, so the resulting data are directly comparable; however, volatile aromatic and volatile halogenated organics were analyzed by more sensitive method in the Phase II program, enabling detection of these compounds at lower concentrations than by the GC/MS method. Low concentrations of the nontarget compounds, hexadecanoic acid and octadecene were tentatively identified in Borings 30, 35, 36, and 37 (Table 3-4-II-3). It should be noted that methylene chloride was also detected in the blanks at a concentration above its indicator level (2.0 ug/g for DataChem).


The data reporting procedures as described in the Laboratory Quality Assurance Plan, RMA (Ebasco, 1985/RIC 86241R02) required that all analyses on a sample be completed within the sample's respective holding time, and that analytical results be corrected for percent recovery and moisture content.





Zoom 1

- 8 Phase I Borings
- 36 Phase II Boring and total depth drilled (ft)
- BIL Below Indicator Level

 Phase II Site Boundary  
(Limits of DBCP Soil Gas Study Area)

Analyte  
Sample Interval (ft.) → 0-1 | DBCP 1.3 ← Level (ug/g)  
DBCP - Dibromochloropropane

0 200  
FEET

Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

FIGURE 3-4-II-1b

Phase I and Phase II  
Analytes Detected Within or Above  
Indicator Levels - Rail Line Area

Rocky Mountain Arsenal, Task 20  
Prepared by: Ebasco Services Incorporated

Revised: 11/3/88

During routine sample analysis, analytical results must have either fallen within or have been diluted within the certified range, provided that holding times had not expired.

During laboratory certification, an analytical method was tested over a certain concentration range to determine the certified range. A typical tested concentration range would have been 0, 0.5x, 1.0x, 2.0x, 5.0x, and 10.0x, where x was the Target Reporting Limit (TRL). The Certified Reporting Limit (CRL) was determined by comparing the target and actual concentrations of the tested range. The upper certified range was the highest target concentration achieved.

If a sample analysis indicated that the sample was not diluted adequately to be within the certified range, the result was reported as greater than the upper certified range times any dilution factors. If a sample had exceeded its holding time and the result was greater than the certified range, the result was reported as greater than the upper certified range. If holding times were exceeded in attempting to dilute the sample until all results were within the certified range, results that were not identified above the certified range, but that may have been present at concentrations above the certified detection limit times the dilution factor.

The results of the Phase II sampling program at Site 3-4 are analyzed as part of the overall data analysis for the Western Study Area Report.



## 5.0 REFERENCES CITED

RIC 86241R02

Ebasco (Ebasco Services Incorporated). 1985, August. Rocky Mountain Arsenal Procedures Manual to Technical Plan. Contract No. DAAK11-84-D-0017.

RIC 88076R04

Ebasco. 1988, March. Final Phase I Contamination Assessment Report; Site 3-4, Nemagon Spill Area, Version 3.2; Task 7. Contract No. DAAK11-84-D-0017.

RIC 88204R02

ESE (Environmental Science and Engineering). 1987. Introduction to the Contamination Assessment Reports. RMA. Prepared for PMO for Rocky Mountain Arsenal Contamination Cleanup.

**Appendix 3- 4 - II-A**

**Chemical Names  
and  
Abbreviations**

APPENDIX 3-4-II-A  
Chemical Names and Abbreviations

Analytic Methods

Abbreviations

Atomic Absorption Spectroscopy	AA
Gas Chromatography/Conductivity Detector	GCCON
Gas Chromatography/Electron Capture Detector	GCECD
Gas Chromatography/Flame Ionization Detector	GCFID
Gas Chromatography/Flame Photometric Detector	GCFPD
Gas Chromatography/Mass Spectrometry	GCMS
Gas Chromatography/Nitrogen Phosphorous Detector	GCNPD
Gas Chromatography/Photoionization Detector	GCPID
High Performance Liquid Chromatography	HPLC
Inductive Coupled Argon Plasma Screen	ICP
Ion Chromatography	IONCHROM
Spectrophotometry	SPECT

PHASE I ANALYTES AND CERTIFIED METHODS  
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u>		<u>TDG</u>
Chloroacetic acid	Chloroacetic acid	CLC2A
Thiodiglycol	Thiodiglycol (TDG)	TDGCL
<u>AGENT PRODUCTS/IONCHROM</u>		<u>GBDP</u>
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	IMPA
<u>ANIONS/IONCHROM</u>		<u>ANIONS</u>
Chloride	Chloride	CL
Fluoride	Fluoride	FL
Sulfate	Sulfate	SO4
<u>ARSENIC/AA</u>	Arsenic	<u>AS</u>
<u>DIBROMOCHLOROPROPANE/GCECD</u>	Dibromochloropropane	<u>DBCP</u>
<u>HYDRAZINES/SPECT</u>		<u>HYD</u>
Hydrazine	Hydrazine	HYDRZ
Methylhydrazine	Methylhydrazine	MHYDRZ
Unsymmetrical dimethyl hydrazine	Unsymmetrical dimethyl hydrazine	UDMH
<u>MERCURY/AA</u>	Mercury	<u>HG</u>

APPENDIX 3-4-II-A (Continued)  
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<b><u>METALS/ICP</u></b>		<b><u>ICP</u></b>
Cadmium	Cadmium	CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
<b><u>ORGANONITROGEN COMPOUNDS/GC/NPD</u></b>		<b><u>ONC</u></b>
n-Nitrosodimethylamine	n-Nitrosodimethylamine	NNDMEA
n-Nitrosodi-n-propylamine	n-Nitrosodi-n-propylamine	NNDNPA
<b><u>ORGANOPHOSPHOROUS COMPOUNDS/GC/FPD</u></b>		<b><u>OPC</u></b>
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphate	DMMP
<b><u>SEMIVOLATILE ORGANIC COMPOUNDS/ GC/MS</u></b>		<b><u>SVO</u></b>
1,4-Oxathiane	1,4-Oxathiane	OXAT
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	PPDDT
Aldrin	Aldrin	ALDRN
Atrazine	Atrazine	ATZ
Chlordane	Chlordane	CLDAN
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMSO2
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dieldrin	Dieldrin	DLDRN
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP*
Dithiane	Dithiane	DITH
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	CL6CP
Isodrin	Isodrin	ISODR
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl-diethyl phosphates	SUPONA
Vapona	Vapona	DDVP

\* DMMP is certified as part of the semivolatile organic compound method only for Hittman-Ebasco Laboratory.

APPENDIX 3-4-II-A (Continued)  
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>VOLATILE ORGANIC COMPOUNDS/ GCMS</u>		<u>VO</u>
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C6H6
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL4
Chlorobenzene	Chlorobenzene	CLC6H5
Chloroform	Chloroform	CHCL3
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC6H5
m-Xylene	m-Xylene	13DMB
Methylene chloride	Methylene chloride	CH2CL2
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o- and p-Xylene	Ortho- & Para-xylene	XYLEN
Tetrachloroethylene	Tetrachloroethene	TCLEE
Toluene	Toluene	MEC6H5
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	12DCE
Trichloroethylene	Trichloroethene	TRCLE

APPENDIX 3-4-II-A  
Phase II

PHASE II ANALYTES AND CERTIFIED METHODS  
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u> (Same as Phase I)		<u>TDC</u>
<u>AGENT PRODUCTS/IONCHROM</u> (Same as Phase I)		<u>GBDP</u>
<u>ANIONS/IONCHROM</u> (Same as Phase I)		<u>ANIONS</u>
<u>ARSENIC/AA</u>	Arsenic	<u>AS</u>
<u>DIBROMOCHLOROPROPANE/GC</u>	Dibromochloropropane	<u>DECP</u>
<u>HYDRAZINES/SPECT</u> (Same as Phase I)		<u>HYD</u>
<u>MERCURY/AA</u>	Mercury	<u>HG</u>
<u>METALS/ICP</u> (Same as Phase I)		<u>ICP</u>
<u>ORGANOCHLORINE PESTICIDES/GCECD</u>		<u>OCP</u>
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	<u>PPDDE</u>
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	<u>PPDDT</u>
Aldrin	Aldrin	<u>ALDRN</u>
Chlordane	Chlordane	<u>CLDAN</u>
Dieldrin	Dieldrin	<u>DLDRN</u>
Endrin	Endrin	<u>ENDRN</u>
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	<u>CL6CP</u>
Isodrin	Isodrin	<u>ISODR</u>
<u>ORGANONITROGEN COMPOUNDS/GCNP</u> (Same as Phase I)		<u>ONC</u>
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u> (Same as Phase I)		<u>OPC</u>

APPENDIX 3-4-II-A (Continued)  
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>ORGANOPHOSPHORUS PESTICIDES/ GCNPD</u>		
Atrazine	Atrazine	OPP
Malathion	Malathion	ATZ
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
		DDVP
<u>ORGANOSULPHUR COMPOUNDS/GCFPD</u>		
1,4-Oxathiane	1,4-Oxathiane	OSC
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	OXAT
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO2
Dimethyldisulfide	Dimethyldisulfide	CPMSO
Dithiane	Dithiane	DMSO
		DITH
<u>SEMIVOLATILE ORGANIC COMPOUNDS/ GCMS</u>		
(Same as Phase I)		SVQ
<u>VOLATILE AROMATIC ORGANIC COMPOUNDS/GCPID</u>		
Benzene	Benzene	VAO
Ethylbenzene	Ethylbenzene	C6H6
m-Xylene	m-Xylene	ETC6H5
o- and p-Xylene	Ortho- & Para-xylene	13DMB
Toluene	Toluene	XYLEN
		MEC6H5
<u>VOLATILE HALOGENATED ORGANIC COMPOUNDS/GCCON</u>		
1,1-Dichloroethane	1,1-Dichloroethane	VHQ
1,2-Dichloroethane	1,2-Dichloroethane	11DCLE
1,1-Dichloroethene	1,1-Dichloroethene	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	11DCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	111TCE
Carbon tetrachloride	Carbon tetrachloride	112TCE
Chlorobenzene	Chlorobenzene	CCL4
Chloroform	Chloroform	CLC6H5
Methylene chloride	Methylene chloride	CHCL3
Tetrachloroethylene	Tetrachloroethene	CH2CL2
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	TCLEE
Trichloroethylene	Trichloroethene	T12DCE
		TRCLE

APPENDIX 3-4-II-A (Continued)  
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>VOLATILE HYDROCARBON COMPOUNDS/ GCFID</u>		
Bicycloheptadiene	Bicycloheptadiene	HYDCBN
Dicyclopentadiene	Dicyclopentadiene	BCHPD
Methylisobutyl ketone	Methylisobutyl ketone	DCPD
		MIBK
<u>VOLATILE ORGANIC COMPOUNDS/GCMS</u> (Same as Phase I)		VQ



**Appendix 3- 4- II-B**  
**Phase II Chemical Data**

APPENDIX 3-4-II-B  
Phase II Chemical Data

The analytical results of the laboratory analysis of soil samples collected as part of the program comprise the first part of Appendix 3-2/3-3-II-A. Data are listed sequentially by boring number and successive depths below the surface. Within each depth, all analytes for which the samples were tested are listed alphabetically. Results are given as less than (LT) the detection limit for the test laboratory, or as detected concentrations above this limit. Based on the accuracy of laboratory test methods, values for GC/MS volatile and GC/MS semivolatile compounds are considered accurate to one significant figure; values for analytes detected by all other methods used in this program are considered accurate to two significant figures.

The second part of Appendix 3-2/3-3-II-A contains data from the blanks associated with the analytical work. Blanks for the soil samples were based on a homogenized subsample of composited samples from a known uncontaminated soil that is stratigraphically similar to the RMA soils. Blanks for the water samples were based on distilled water. Control samples, or blanks, are introduced into the train of environmental samples to function as monitors on the performance of the analytical method. These samples function as quality control (QC) samples, and are an integral part of the quality assurance (QA) program for the project. The method blanks listed in this Appendix were utilized to verify that the laboratory was not a source of sample contamination. If contamination were detected in a method blank, corrective actions would have been taken to assure that reported concentrations of target analytes reflected sample analytes, and not analytes introduced by the laboratory process.

## Ebasco Services Incorporated

## Rocky Mountain Arsenal Program

03/20/88

## Summary of Analytical Results

Task 20, Site 3-4,

Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	2-3	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND005
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND005
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND005
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND005
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND005
			m-Xylene	LT 2.60 -1	ug/g	DNC005
			Benzene	LT 8.50 -2	ug/g	DNC005
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND005
			Methylene Chloride	LT 3.70 0	ug/g	DND005
			Chloroform	LT 6.80 -2	ug/g	DND005
			Chlorobenzene	LT 2.00 -1	ug/g	DND005
			Ethylbenzene	LT 1.60 -1	ug/g	DNC005
			Toluene	LT 1.90 -1	ug/g	DNC005
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DNC005
			Tetrachloroethene	LT 2.70 -1	ug/g	DND005
			Trichloroethene	LT 1.40 -1	ug/g	DND005
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC005
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND006
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND006
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND006
0028	4-5	Soil	1,1-Dichloroethane	LT 7.40 -2	ug/g	DND006
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND006
			m-Xylene	LT 2.60 -1	ug/g	DNC006
			Benzene	LT 8.50 -2	ug/g	DNC006
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND006
			Methylene Chloride	LT 3.70 0	ug/g	DND006
			Chloroform	LT 6.80 -2	ug/g	DND006
			Chlorobenzene	LT 2.00 -1	ug/g	DND006
			Ethylbenzene	LT 1.60 -1	ug/g	DNC006
			Toluene	LT 1.90 -1	ug/g	DNC006
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND006
			Tetrachloroethene	LT 2.70 -1	ug/g	DND006
			Trichloroethene	LT 1.40 -1	ug/g	DND006

Notes: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Newagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0028	4-5	Soil	Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC006
0028	7-8	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND007
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND007
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND007
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND007
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND007
			m-Xylene	LT 2.60 -1	ug/g	DNC007
			Benzene	LT 8.50 -2	ug/g	DNC007
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND007
			Methylene Chloride	LT 3.70 0	ug/g	DND007
			Chloroform	LT 6.80 -2	ug/g	DND007
			Chlorobenzene	LT 2.00 -1	ug/g	DND007
			Ethylbenzene	LT 1.60 -1	ug/g	DNC007
			Toluene	LT 1.90 -1	ug/g	DNC007
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND007
			Tetrachloroethene	LT 2.70 -1	ug/g	DND007
			Trichloroethene	LT 1.40 -1	ug/g	DND007
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC007
0029	2-3	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND008
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND008
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND008
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND008
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND008
			m-Xylene	LT 2.60 -1	ug/g	DNC008
			Benzene	LT 8.50 -2	ug/g	DNC008
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND008
			Methylene Chloride	LT 3.70 0	ug/g	DND008
			Chloroform	LT 6.80 -2	ug/g	DND008
			Chlorobenzene	LT 2.00 -1	ug/g	DND008
			Ethylbenzene	LT 1.60 -1	ug/g	DNC008
			Toluene	LT 1.90 -1	ug/g	DNC008
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND008
			Tetrachloroethene	LT 2.70 -1	ug/g	DND008

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4,

Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	2-3	Soil	Trichloroethene Ortho- & Para-Xylene	LT 1.40 -1 LT 3.90 -1	ug/g ug/g	DND008 DNC008
0029	4-5	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND009 DND009 DND009 DND009 DND009
			m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform	LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g ug/g ug/g ug/g ug/g	DNC009 DNC009 DND009 DND009 DND009
			Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene Tetrachloroethene	LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1 LT 2.70 -1	ug/g ug/g ug/g ug/g ug/g	DND009 DNC009 DNC009 DND009 DND009
			Trichloroethene Ortho- & Para-Xylene	LT 1.40 -1 LT 3.90 -1	ug/g ug/g	DND009 DNC009
0029	7-8	Soil	1,1,1-Trichloroethane 1,1,2-Trichloroethane 1,1-Dichloroethene 1,1-Dichloroethane 1,2-Dichloroethane	LT 8.80 -2 LT 2.60 -1 LT 2.40 -1 LT 7.40 -2 LT 8.50 -2	ug/g ug/g ug/g ug/g ug/g	DND010 DND010 DND010 DND010 DND010
			m-Xylene Benzene Carbon Tetrachloride Methylene Chloride Chloroform	LT 2.60 -1 LT 8.50 -2 LT 1.20 -1 LT 3.70 0 LT 6.80 -2	ug/g ug/g ug/g ug/g ug/g	DNC010 DNC010 DND010 DND010 DND010
			Chlorobenzene Ethylbenzene Toluene Trans-1,2-Dichloroethene	LT 2.00 -1 LT 1.60 -1 LT 1.90 -1 LT 2.60 -1	ug/g ug/g ug/g ug/g	DND010 DNC010 DNC010 DND010

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0029	7-8	Soil	Tetrachloroethene	LT 2.70 -1	ug/g	DND010
			Trichloroethene	LT 1.40 -1	ug/g	DND010
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC010
0030	2-3	Soil	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND011
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND011
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND011
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND011
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND011
			m-Xylene	LT 2.60 -1	ug/g	DNC011
			Benzene	LT 8.50 -2	ug/g	DNC011
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND011
			Methylene Chloride	LT 3.70 0	ug/g	DND011
			Chloroform	LT 6.80 -2	ug/g	DND011
0030	4-5	Soil	Chlorobenzene	LT 2.00 -1	ug/g	DND011
			Ethylbenzene	LT 1.60 -1	ug/g	DNC011
			Toluene	LT 1.90 -1	ug/g	DNC011
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND011
			Tetrachloroethene	LT 2.70 -1	ug/g	DND011
			Trichloroethene	LT 1.40 -1	ug/g	DND011
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC011
			1,1,1-Trichloroethane	LT 4.30 -1	ug/g	DNB002
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND012
			1,1,2-Trichloroethane	LT 3.90 -1	ug/g	DNB002
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND012
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND012
			1,1-Dichloroethane	LT 1.70 0	ug/g	DNB002
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND012
			1,2-Dichloroethane	LT 5.60 -1	ug/g	DNB002
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND012
			m-Xylene	LT 7.40 -1	ug/g	DNB002
			m-Xylene	LT 2.60 -1	ug/g	DNC012
			Bicycloheptadiene	LT 3.60 -1	ug/g	DNB002
			Benzene	LT 2.50 -1	ug/g	DNB002

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Newagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0030	4-5	Soil	Benzene	LT 8.50 -2	ug/g	DNC012
			Carbon Tetrachloride	LT 2.50 -1	ug/g	DNB002
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND012
			Methylene Chloride	LT 1.50 0	ug/g	DNB002
			Methylene Chloride	LT 3.70 0	ug/g	DND012
			Chloroform	LT 2.90 -1	ug/g	DNB002
			Chloroform	LT 6.80 -2	ug/g	DND012
			Chlorobenzene	LT 1.50 0	ug/g	DNB002
			Chlorobenzene	LT 2.00 -1	ug/g	DND012
			Dibromochloropropane	LT 2.40 0	ug/g	DNB002
			Dicyclopentadiene	LT 6.40 -1	ug/g	DNB002
			Dimethyldisulfide	LT 2.00 1	ug/g	DNB002
			Ethylbenzene	LT 3.80 -1	ug/g	DNB002
			Ethylbenzene	LT 1.60 -1	ug/g	DNC012
			Toluene	LT 2.50 -1	ug/g	DNB002
			Toluene	LT 1.90 -1	ug/g	DNC012
			Methylisobutyl Ketone	LT 7.30 -1	ug/g	DNB002
			Trans-1,2-Dichloroethene	LT 1.70 0	ug/g	DNB002
			Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND012
			Tetrachloroethene	LT 2.50 -1	ug/g	DNB002
0030	7-8	Soil	Tetrachloroethene	LT 2.70 -1	ug/g	DND012
			Trichloroethene	LT 5.40 -1	ug/g	DNB002
			Trichloroethene	LT 1.40 -1	ug/g	DND012
			Ortho- & Para-Xylene	LT 4.90 0	ug/g	DNB002
			Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC012
			1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND013
			1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND013
			1,1-Dichloroethene	LT 2.40 -1	ug/g	DND013
			1,1-Dichloroethane	LT 7.40 -2	ug/g	DND013
			1,2-Dichloroethane	LT 8.50 -2	ug/g	DND013
			m-Xylene	LT 2.60 -1	ug/g	DNC013
			Benzene	LT 8.50 -2	ug/g	DNC013
			Carbon Tetrachloride	LT 1.20 -1	ug/g	DND013

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0030	7-8	Soil	Methylene Chloride	LT 3.70	0 ug/g	DND013
			Chloroform	LT 6.80	-2 ug/g	DND013
			Chlorobenzene	LT 2.00	-1 ug/g	DND013
			Ethylbenzene	LT 1.60	-1 ug/g	DNC013
			Toluene	LT 1.90	-1 ug/g	DNC013
0031	0-1	Soil	Trans-1,2-Dichloroethene	LT 2.60	-1 ug/g	DND013
			Tetrachloroethene	LT 2.70	-1 ug/g	DND013
			Trichloroethene	LT 1.40	-1 ug/g	DND013
			Ortho- & Para-Xylene	LT 3.90	-1 ug/g	DNC013
			Dibromochloropropane	1.30	0 ug/g	DM0005
0031	4-5	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0006
0032	0-1	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0007
0032	4-5	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0008
0033	0-1	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0011
0033	4-5	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0012
0034	0-1	Soil	Dibromochloropropane	3.80	-1 ug/g	DM0009
0034	4-5	Soil	Dibromochloropropane	LT 5.00	-3 ug/g	DM0010
0035	0-1	Soil	Aldrin	LT 3.00	-1 ug/g	DMP002
			Atrazine	LT 3.00	-1 ug/g	DMP002
			Hexachlorocyclopentadiene	LT 6.00	-1 ug/g	DMP002
			Chlordane	LT 2.00	0 ug/g	DMP002
			p-Chlorophenylmethyl Sulfide	LT 9.00	-1 ug/g	DMP002
			p-Chlorophenylmethyl Sulfoxide	LT 3.00	-1 ug/g	DMP002
			p-Chlorophenylmethyl Sulfone	LT 3.00	-1 ug/g	DMP002
			Dibromochloropropane	LT 3.00	-1 ug/g	DMP002
			Dicyclopentadiene	LT 1.00	0 ug/g	DMP002
			Vapona	LT 3.00	0 ug/g	DMP002
			Diisopropylmethyl Phosphonate	LT 1.00	0 ug/g	DMP002

Note: Results for some parameters may appear in more than one analytical fraction.



## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0035	0-1	Soil	Dithiane	LT 4.00 -1	ug/g	DMP002
			Dieldrin	LT 3.00 -1	ug/g	DMP002
			Endrin	LT 5.00 -1	ug/g	DMP002
			Isodrin	LT 3.00 -1	ug/g	DMP002
			Malathion	LT 7.00 -1	ug/g	DMP002
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP002
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP002
			Dichlorodiphenyltrichloroethane	LT 5.00 -1	ug/g	DMP002
			Parathion	LT 9.00 -1	ug/g	DMP002
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6.00 -1	ug/g	DMP002
			Aldrin	LT 3.00 -1	ug/g	DMP003
			Atrazine	LT 3.00 -1	ug/g	DMP003
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP003
			Chlordane	LT 2.00 0	ug/g	DMP003
0035	2-3	Soil	p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP003
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP003
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP003
			Dibromochloropropane	LT 1.00 0	ug/g	DMP003
			Dicyclopentadiene	LT 3.00 0	ug/g	DMP003
			Vapona	LT 3.00 0	ug/g	DMP003
			Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP003
			Dithiane	LT 4.00 -1	ug/g	DMP003
			Dieldrin	LT 3.00 -1	ug/g	DMP003
			Endrin	LT 5.00 -1	ug/g	DMP003
			Isodrin	LT 3.00 -1	ug/g	DMP003
			Malathion	LT 7.00 -1	ug/g	DMP003
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP003
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP003
			Dichlorodiphenyltrichloroethane	LT 5.00 -1	ug/g	DMP003
			Parathion	LT 9.00 -1	ug/g	DMP003

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Nemagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0035	2-3	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP003
0036	0-1	Soil	Aldrin	LT 3.00 -1	ug/g	DMP004
			Atrazine	LT 3.00 -1	ug/g	DMP004
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP004
			Chlordane	LT 2.00 0	ug/g	DMP004
			p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP004
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP004
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP004
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP004
			Dicyclopentadiene	LT 1.00 0	ug/g	DMP004
			Vapona	LT 3.00 0	ug/g	DMP004
			Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP004
			Dithiane	LT 4.00 -1	ug/g	DMP004
			Dieldrin	LT 3.00 -1	ug/g	DMP004
			Endrin	LT 5.00 -1	ug/g	DMP004
0036	2-3	Soil	Isodrin	LT 3.00 -1	ug/g	DMP004
			Malathion	LT 7.00 -1	ug/g	DMP004
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP004
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP004
			Dichlorodiphenyltrichloro-ethane	LT 5.00 -1	ug/g	DMP004
			Parathion	LT 9.00 -1	ug/g	DMP004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00 -1	ug/g	DMP004
			Aldrin	LT 3.00 -1	ug/g	DMP005
			Atrazine	LT 3.00 -1	ug/g	DMP005
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP005
			Chlordane	LT 2.00 0	ug/g	DMP005
			p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP005
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP005
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP005
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP005

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Remagen Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0036	2-3	Soil	Dicyclopentadiene	LT 1.00	0 ug/g	DMP005
			Vapona	LT 3.00	0 ug/g	DMP005
			Diisopropylmethyl Phosphonate	LT 1.00	0 ug/g	DMP005
			Dithiane	LT 4.00	-1 ug/g	DMP005
			Dieldrin	LT 3.00	-1 ug/g	DMP005
			Endrin	LT 5.00	-1 ug/g	DMP005
			Isodrin	LT 3.00	-1 ug/g	DMP005
			Malathion	LT 7.00	-1 ug/g	DMP005
			1,4-Oxathiane	LT 3.00	-1 ug/g	DMP005
			Dichlorodiphenylethane	LT 6.00	-1 ug/g	DMP005
			Dichlorodiphenyltrichloro-ethane	LT 5.00	-1 ug/g	DMP005
			Parathion	LT 9.00	-1 ug/g	DMP005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.00	-1 ug/g	DMP005
			Aldrin	1.92	0 ug/g	DMP006
			Atrazine	LT 3.00	-1 ug/g	DMP006
			Hexachlorocyclopentadiene	LT 6.00	-1 ug/g	DMP006
0037	0-1	Soil	Chlordane	LT 2.00	0 ug/g	DMP006
			p-Chlorophenylmethyl Sulfide	LT 9.00	-1 ug/g	DMP006
			p-Chlorophenylmethyl Sulfoxide	LT 3.00	-1 ug/g	DMP006
			p-Chlorophenylmethyl Sulfone	LT 3.00	-1 ug/g	DMP006
			Dibromochloropropane	LT 1.00	0 ug/g	DMP006
			Dicyclopentadiene	LT 3.00	0 ug/g	DMP006
			Vapona	LT 1.00	0 ug/g	DMP006
			Diisopropylmethyl Phosphonate	LT 1.00	0 ug/g	DMP006
			Dithiane	LT 4.00	-1 ug/g	DMP006
			Dieldrin	7.43	0 ug/g	DMP006
			Endrin	LT 5.00	-1 ug/g	DMP006
			Isodrin	LT 3.00	-1 ug/g	DMP006
			Malathion	LT 7.00	-1 ug/g	DMP006
			1,4-Oxathiane	LT 3.00	-1 ug/g	DMP006
			Dichlorodiphenylethane	LT 6.00	-1 ug/g	DMP006
			Dichlorodiphenyltrichloro-ethane	LT 5.00	-1 ug/g	DMP006

Note: Results for some parameters may appear in more than one analytical fraction.

## Summary of Analytical Results

Task 20, Site 3-4, Phase Two, Pentagon Spill Area

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0037	0-1	Soil	Parathion	LT 9.00 -1	ug/g	DMP0006
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP0006
0037	2-3	Soil	Aldrin	LT 3.00 -1	ug/g	DMP0007
			Atrazine	LT 3.00 -1	ug/g	DMP0007
			Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP0007
			Chlordane	LT 2.00 0	ug/g	DMP0007
			p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP0007
			p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP0007
			p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP0007
			Dibromochloropropane	LT 3.00 -1	ug/g	DMP0007
			Dicyclopentadiene	LT 1.00 0	ug/g	DMP0007
			Vapona	LT 3.00 0	ug/g	DMP0007
			Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP0007
			Dithiane	LT 4.00 -1	ug/g	DMP0007
			Dieldrin	4.59 -1	ug/g	DMP0007
			Endrin	LT 5.00 -1	ug/g	DMP0007
			Isodrin	LT 3.00 -1	ug/g	DMP0007
			Malathion	LT 7.00 -1	ug/g	DMP0007
			1,4-Oxathiane	LT 3.00 -1	ug/g	DMP0007
			Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP0007
			Dichlorodiphenyltrichloroethane	LT 5.00 -1	ug/g	DMP0007
			Parathion	LT 9.00 -1	ug/g	DMP0007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6.00 -1	ug/g	DMP0007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated  
Summary of Analytical Results

Rocky Mountain Arsenal Program  
Blanks Associated with Task 20  
Phase II, Site 3-4, Nemagon Spill Area

09/20/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dibromochloropropane	LT 5.00 -3	ug/g	DMD001
Blank	Aldrin	LT 3.00 -1	ug/g	DMP001
Blank	Atrazine	LT 3.00 -1	ug/g	DMP001
Blank	Hexachlorocyclopentadiene	LT 6.00 -1	ug/g	DMP001
Blank	Chlordane	LT 2.00 0	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3.00 -1	ug/g	DMP001
Blank	p-Chlorophenylmethyl Sulfone	LT 3.00 -1	ug/g	DMP001
Blank	Dibromochloropropane	LT 3.00 -1	ug/g	DMP001
Blank	Dicyclopentadiene	LT 1.00 0	ug/g	DMP001
Blank	Vapona	LT 3.00 0	ug/g	DMP001
Blank	Diisopropylmethyl Phosphonate	LT 1.00 0	ug/g	DMP001
Blank	Dithiane	LT 4.00 -1	ug/g	DMP001
Blank	Dieldrin	LT 3.00 -1	ug/g	DMP001
Blank	Endrin	LT 5.00 -1	ug/g	DMP001
Blank	Isodrin	LT 3.00 -1	ug/g	DMP001
Blank	Malathion	LT 7.00 -1	ug/g	DMP001
Blank	1,4-Oxathiane	LT 3.00 -1	ug/g	DMP001
Blank	Dichlorodiphenylethane	LT 6.00 -1	ug/g	DMP001
Blank	Dichlorodiphenyltrichloroethane	LT 5.00 -1	ug/g	DMP001
Blank	Parathion	LT 9.00 -1	ug/g	DMP001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6.00 -1	ug/g	DMP001
Blank	1,1,1-Trichloroethane	LT 4.30 -1	ug/g	DNB001
Blank	1,1,2-Trichloroethane	LT 3.90 -1	ug/g	DNB001
Blank	1,1-Dichloroethane	LT 1.70 0	ug/g	DNB001
Blank	Trans-1,2-Dichloroethane	LT 1.70 0	ug/g	DNB001
Blank	1,2-Dichloroethane	LT 5.60 -1	ug/g	DNB001
Blank	m-Xylene	LT 7.40 -1	ug/g	DNB001
Blank	Bicycloheptadiene	LT 3.60 -1	ug/g	DNB001
Blank	Benzene	LT 2.50 -1	ug/g	DNB001
Blank	Carbon Tetrachloride	LT 2.50 -1	ug/g	DNB001
Blank	Methylene Chloride	LT 4.58 0	ug/g	DNB001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

## Summary of Analytical Results

Blanks Associated with Task 20  
Phase II, Site 3-4, Nemagon Spill Area

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Chloroform	LT 2.90 -1	ug/g	DNR001
Blank	Chlorobenzene	LT 1.50 0	ug/g	DNR001
Blank	Dibromochloropropane	LT 2.40 0	ug/g	DNR001
Blank	Dicyclopentadiene	LT 6.40 -1	ug/g	DNR001
Blank	Dimethyldisulfide	LT 2.00 1	ug/g	DNR001
Blank	Ethylbenzene	LT 3.80 -1	ug/g	DNR001
Blank	Toluene	LT 2.50 -1	ug/g	DNR001
Blank	Methylisobutyl Ketone	LT 7.30 -1	ug/g	DNR001
Blank	Tetrachloroethene	LT 2.50 -1	ug/g	DNR001
Blank	Trichloroethene	LT 5.40 -1	ug/g	DNR001
Blank	Ortho- & Para-Xylene	LT 4.90 0	ug/g	DNR001
Blank	m-Xylene	LT 2.60 -1	ug/g	DNC001
Blank	Benzene	LT 8.50 -2	ug/g	DNC001
Blank	Ethylbenzene	LT 1.60 -1	ug/g	DNC001
Blank	Toluene	LT 1.90 -1	ug/g	DNC001
Blank	Ortho- & Para-Xylene	LT 3.90 -1	ug/g	DNC001
Blank	1,1,1-Trichloroethane	LT 8.80 -2	ug/g	DND001
Blank	1,1,2-Trichloroethane	LT 2.60 -1	ug/g	DND001
Blank	1,1-Dichloroethene	LT 2.40 -1	ug/g	DND001
Blank	1,1-Dichloroethane	LT 7.40 -2	ug/g	DND001
Blank	Trans-1,2-Dichloroethene	LT 2.60 -1	ug/g	DND001
Blank	1,2-Dichloroethane	LT 8.50 -2	ug/g	DND001
Blank	Carbon Tetrachloride	LT 1.20 -1	ug/g	DND001
Blank	Methylene Chloride	LT 3.70 0	ug/g	DND001
Blank	Chloroform	LT 6.80 -2	ug/g	DND001
Blank	Chlorobenzene	LT 2.00 -1	ug/g	DND001
Blank	Tetrachloroethene	LT 2.70 -1	ug/g	DND001
Blank	Trichloroethene	LT 1.40 -1	ug/g	DND001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.